CS9L/CSPL SERIES: ULTRA HF CLOCK OSCILLATOR, PECL, +3.3 VDC or +2.5VDC

DESCRIPTION: A crystal controlled, high frequency, highly stable oscillator, adhering to Positive Emitter Coupled Logic (PECL) Standards and fundamental crystal or analog multiplication technologies. The output can be Tri-stated to facilitate testing or combined multiple clocks. The device is contained in a sub-miniature, very low profile, leadless ceramic SMD package with 6 gold contact pads. This miniature oscillator is ideal for today’s automated assembly environments.

APPLICATIONS AND FEATURES:

- Infiniband; Fiber Channel; SATA; 10GbE; Network Processors; SOHO Routing; Switches;
- Common Frequencies: 150 MHz; 156.25 MHz; 155.52 MHz; 161.1328 MHz; 212.5MHz; 312.5MHz
- +3.3 VDC or +2.5VDC PECL
- Frequency Range from 150.000 to 700 MHz
- Analog multiplication
- Miniature Ceramic SMD Package Available on Tape and Reel
- Lead Free and ROHS Compliant

### ABSOLUTE MAXIMUM RATINGS:

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature range</td>
<td>Ta</td>
<td>-40…+85</td>
<td>°C</td>
</tr>
<tr>
<td>Storage temperature range</td>
<td>T(stg)</td>
<td>-55…+90</td>
<td>°C</td>
</tr>
<tr>
<td>Supply voltage</td>
<td>Vcc</td>
<td>+4.6</td>
<td>VDC</td>
</tr>
<tr>
<td>Maximum Input Voltage</td>
<td>Vi</td>
<td>Vss-0.5…Vcc+0.5</td>
<td>VDC</td>
</tr>
<tr>
<td>Maximum Output Voltage</td>
<td>Vo</td>
<td>Vss-0.5…Vcc+0.5</td>
<td>VDC</td>
</tr>
</tbody>
</table>

### ELECTRICAL PARAMETERS:

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>SYMBOL</th>
<th>TEST CONDITIONS ¹</th>
<th>VALUE</th>
<th>UNIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Frequency</td>
<td>fo</td>
<td></td>
<td>150.000 ~ 700.00''</td>
<td>MHz</td>
</tr>
<tr>
<td>Supply Voltage</td>
<td>Vcc</td>
<td></td>
<td>+3.3 or +2.5 ±5%</td>
<td>VDC</td>
</tr>
<tr>
<td>Supply Current</td>
<td>Is</td>
<td></td>
<td>80.0 MAX</td>
<td>mA</td>
</tr>
<tr>
<td>Output Logic Type</td>
<td></td>
<td></td>
<td>PECL</td>
<td></td>
</tr>
<tr>
<td>Load</td>
<td></td>
<td></td>
<td>50</td>
<td>Ω</td>
</tr>
<tr>
<td>Output Voltage Levels</td>
<td>Voh</td>
<td>min</td>
<td>Vcc-1.025</td>
<td>VDC</td>
</tr>
<tr>
<td></td>
<td>Vol</td>
<td>max</td>
<td>Vcc-1.620</td>
<td>VDC</td>
</tr>
<tr>
<td>Duty Cycle</td>
<td>DC</td>
<td></td>
<td>Measured at 50% of Vcc</td>
<td>%</td>
</tr>
<tr>
<td>Rise / Fall Time</td>
<td>tr / tf</td>
<td></td>
<td>0.7 TYP 1.0 MAX²</td>
<td>ns</td>
</tr>
</tbody>
</table>

### Jitter

- Integrated Phase RMS, Fj = 12 kHz…20 MHz⁶
- Integrated Phase RMS tii offset frequency 50KHz to 80MHz²
- Deterministic period Jitter Dj using wavecrest analyzer⁴
- Random period Jitter Rj using wavecrest analyzer⁴
- Acumm. Peak to Peak Jitter Tp-p using wavecrest analyzer²

### Phase Noise

- L(Δf) typ. @212.5MHz⁶

### Sub Harmonics

- f sub Load, nom, Supply nom

### Overall Frequency Stability


### Pin

- Output Enabled
- Output Disabled

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PART NUMBERING SYSTEM:

<table>
<thead>
<tr>
<th>SERIES</th>
<th>SYMMETRY</th>
<th>TEMPERATURE RANGE (°C)</th>
<th>FREQUENCY STABILITY (Overall)</th>
<th>FREQUENCY (MHz)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS9L: UHF +3.3Vdc Clock with PECL Comp. Output</td>
<td>A: 40/60 to 60/40%</td>
<td>R: 0…+50</td>
<td>K: ±20 ppm**</td>
<td>150.000…700.000</td>
</tr>
<tr>
<td>CSPL: UHF +2.5Vdc Clock with PECL Comp. Output</td>
<td>T: 45/55 to 55/45%</td>
<td>S: 0…+70</td>
<td>I: ±25 ppm**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>U: -20…+70</td>
<td>H: ±50 ppm</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>V: -40…+85**</td>
<td>J: ±100 ppm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EXAMPLE: CS9LASH-155.520
Clock Oscillator, 7x5mm Package, +3.3 VDC Supply Voltage, PECL Output, Standard Symmetry, 0…+70°C Operating Temperature Range, ±50 ppm Total Frequency Stability, 155.520 MHz

**Above 300MHz extended temp range and ±25ppm stability may not be available, jitter may vary upon spec requirements. Please consult the factory for any custom requirements.

MECHANICAL PARAMETERS:

OUTLINE TOLERANCE:
±0.006" / 0.15mm (Unless otherwise specified)

PIN FUNCTIONS:
[1] ENABLE/ DISABLE
[2] NO CONNECT
[3] CASE GROUND
[4] OUTPUT
[5] COMP. OUTPUT
[6] SUPPLY VOLTAGE

MARKING:
CS9LASH
155.52
RAL D/C

"0.01µF external by-pass filter is recommended as seen on solder pattern."
REFLOW PROFILE:

**ROHS COMPLIANT**

- 260 °C
- 250 °C
- 217 °C
- 200 °C
- 150 °C
- 25 °C

PEAK 10 s Max
20-40 s

60 TO 90 s

-6°C/s MAX COOLING

+3°C/s MAX PREHEATING

60 TO 120 s

TIME (SECONDS)